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Efforts to Achieve a Resource Efficient Society Approach

The issues of water and resource scarcity, triggered by rising water demand and population growth—resulting in higher volumes of resources collected, extracted, used, and eventually emitted as waste—are common concerns for the entire world. Hitachi’s business operations will respond to these issues by working with our customers and society to help build a society that uses water and other resources efficiently.

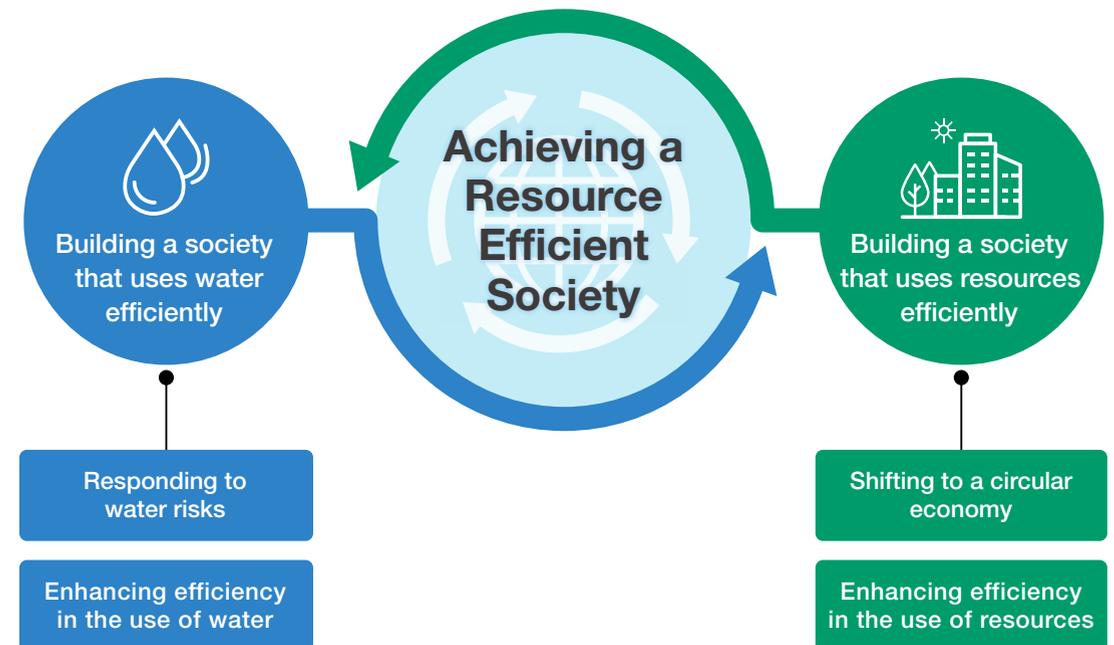
Initiatives in the Value Chain

In order to improve the efficiency of water and resource use throughout the product life cycle, we will optimize water use and wastewater treatment in the supply chain, provide water-efficient products and services, push eco-design initiatives, and develop tools, applications, and services to achieve a circular economy.

Initiatives at Business Sites

We have set a fiscal 2050 target of improving the usage efficiency of water and other resources by 50% compared to fiscal 2010 levels. We will create higher economic value using less water and other resources and pursue production activities with a low environmental burden.

▶ Initiatives to Achieve a Resource Efficient Society



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Building a Water Efficient Society

Hitachi's Approach to Water Risks

Approach GRI 303-1/303-2/303-5

In recent years, a sense of crisis over water resource depletion and pollution has been growing worldwide. Hitachi is working to enhance the efficiency of water use within the Group and to respond to water risks with a view to achieving a water efficient society.

Hitachi operates a variety of businesses worldwide. Since water risks vary by region and the type of business, it is important to identify their respective risks and implement countermeasures tailored to the specific risks identified. To promote these efforts, we have issued Water Risk Guidelines*1, which put together policies related to water risk identification and countermeasures, and we strive to better understand water risks faced by some 150 manufacturing sites around the world that are classified as category A in our environmental management classification.

We identify water risks at each site by using our Environmental Data Collection System (Eco-DS) and such globally recognized tools for water risk assessment as the Aqueduct, developed by the World Resources Institute (WRI); the Water Risk Filter, developed by the World Wide Fund for Nature (WWF) and the German development finance institution DEG; and the European Union's Flood Hazard Map of the World. We analyze and evaluate the current status of water risks for each business unit and Group company, per country and region, and for the entire Group once a year.

In light of the results, we work to reduce water usage according to the characteristics of local communities and businesses and strengthen water management with the aim

of improving efficiency in the use of water by 50%, which we have set as a long-term environmental target.

Achievements in Fiscal 2020

In fiscal 2020, we issued a revised version of our Water Risk Guidelines reflecting revisions to Aqueduct 3.0 and Water Risk Filter 5.0 and also included case studies. We also revised the checklist for identifying regional and operational water risks. Based on these revisions, we assessed the water risks in each region and identified high regional water risks at a total of 10 business sites operating in China, India, Vietnam, and Thailand out of some 150 manufacturing sites around the world that are classified as category A in our environmental management classification. With these results, we then assessed the operational water risks, which were found to be "low to medium-high" at the 10 business sites identified earlier. For this reason, Hitachi does not consider that any of its business sites face a comprehensively high water risk. The water usage at the 10 business sites is 0.47 million m³, accounting for about 2% of the 22.11 million m³ of water used in Hitachi's manufacturing processes.

Additionally, we used Aqueduct to ascertain the water stress*2 levels at 129 suppliers in China and 29 in Thailand, and shared the results within the Group.

Identification of Water Risks Using the Environmental Data Collection System (Eco-DS)

	Regional water risks	Operational water risks
Number of evaluation items related to water resources, water quality, water damage, regulations, reputational risk, etc.	Approximately 50	Approximately 70
Risk identification method	Various water risk assessment tools, including Aqueduct, are combined to identify risks based on the address information	Risks are identified from information such as a business site's volume of water intake and effluents discharged, and its water-related initiatives
Risk assessment	Assessed using a five-level scale*3 from low to extremely-high	Assessed using a five-level scale from low to extremely-high
Risk results	High at 10 sites	Low to medium-high at all sites, including the 10 to the left
	No business sites are facing a comprehensively high water risk.	

*1 Prepared with reference to *Setting Site Water Targets Informed By Catchment Context* created by members of the UN Global Compact, the CEO Water Mandate, the Pacific Institute, WRI, WWF, and other global institutions with the aim of helping companies set effective site water targets.

*2 Water stress occurs when demand for water outpaces availability. The maximum volume of available water supply per capita is used as an index to measure levels of scarcity. The minimum volume of water required for living, agriculture, industry, energy, and the environment is considered to be 1,700 m³ per person per year, and regions below this level are said to experience water stress.

*3 Five-level scale: low, low-medium, medium-high, high, extremely-high

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Management Framework for Water Resources

Structure

Hitachi has set a long-term goal of improving efficiency in the use of water, with a view to achieving a water efficient society. We are carrying out activities in pursuit of this goal at some 150 manufacturing sites around the world that are classified as category A in our environmental management classification. The Water Risk Response Working Group (WG), consisting of members of major business units and Group companies, discusses the formulation of water-related plans and their level of achievement. These are then deliberated on and finalized in the Eco-Management Meetings. Important items related to environmental initiatives including water risk are deliberated in the Executive Sustainability Committee.

In order to conduct water management efficiently and effectively, we operate an Environmental Data Collection System (Eco-DS) that collects environmental load data at all the Hitachi Group's business sites (approximately 1,000 sites). The collected data is aggregated and analyzed, and used for PDCA management of measures including the identification of water-related issues and the sharing of case studies.

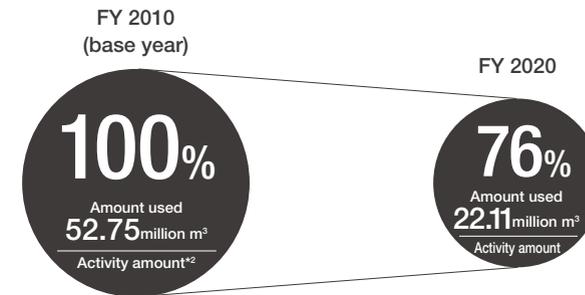
Management of Water Usage at Business Sites

Activities

In fiscal 2020, we set a target of a 24% reduction (over the base year of fiscal 2010) for water usage per unit and achieved a 24% reduction. The volume of water used declined by 30.64 million m³, equivalent to 58% from the base year. Our measures to reduce water usage include more stringent management of water intake using flowmeters, leakage control by installing above-ground water pipes, circular use of cooling water, and reuse of purified waste water.

Environmental Action Plan for 2021 Management Values

Reduction in Water Usage*1 per Unit (Hitachi Group)



Reduction in Water Usage*1 per Unit compared to base year

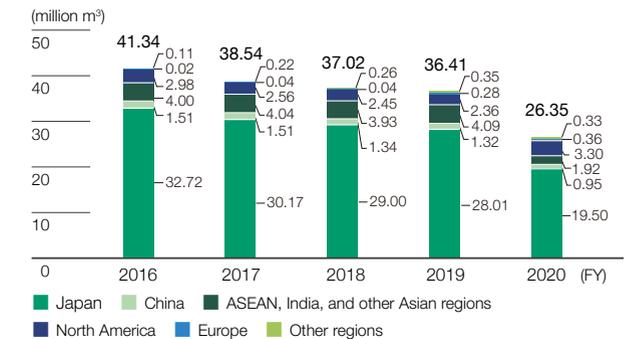
24% reduction

FY 2020 reduction target rate: 24%

*1 Amount of water used in the production process.

*2 Activity amount is a value closely related to water use at each business site (for example, output, sales, and production weight).

Water Input*1 (Hitachi Group)



*1 The total amount of water input in manufacturing processes and for other purposes, such as in offices.

Note: Regional classifications were changed in fiscal 2020, and the past data was recalculated based on this.

[Case Studies of Improving Water Use Efficiency](#)

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Products and Services that Contribute to Resolving Water Issues

Activities

Hitachi is committed to contributing to the effective use of limited water resources. We will help to solve numerous issues faced by customers that are involved in the water supply and sewerage business by combining our track record and know-how of operational technology (OT) and products cultivated over many years as a comprehensive water service provider with IT which Hitachi possesses abundant experience and knowledge of in diverse fields.

Hitachi's Water-related Products and Services

Activity field	Products or services (implementation to date)
Creating water resources	Wastewater recycling systems
	Seawater desalination systems
Developing water infrastructure	Water and sewage treatment, etc. (over 200 sites in about 40 countries and regions)
	Water purification plants (approximately 700 plants in Japan)
	Sewage treatment plants (approximately 900 plants in Japan)
	Comprehensive digital solutions for water and sewage treatment operators

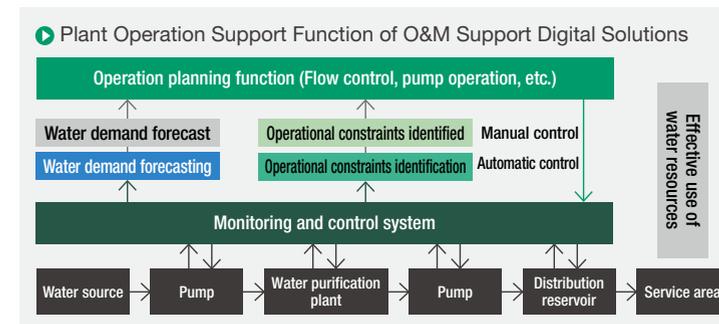
Achievements in Fiscal 2020

Japan

Optimization from Water Sources to Water Distribution Management Utilizing Digital Technologies

Japan's waterworks bureau is facing various issues such as aging facilities and skills transfers. In response, Hitachi is strengthening public-private partnerships by providing its Operations and Maintenance (O&M) Support Digital Solution which utilizes the cloud. In fiscal 2018, at a water purification facility Hitachi introduced the O&M Support Digital Solution to support equipment inspections, manage water distribution using machine learning, and predict residual chlorine concentrations using reaction models by linking supervisory control and data acquisition (SCADA) systems, inspection tablets, and the data center. In fiscal 2020, we verified the functionality and efficient maintenance and management of multiple water processing systems over a wide area, as well as the appropriate water volume and residual chlorine management in water purification plants with different water treatment methods.

Through the use of verification tests, Hitachi has been able to confirm the efficiency at several plants in Japan. And in fiscal 2021, we expanded the lineup of O&M Support Digital Solutions and started providing new features such as AI-driven equipment diagnostics, water quality predictions, and operation support.



Papua New Guinea

Construction of a Sewage Treatment Plant to Address Hygiene Issues and Protect the Marine Environment

Sewage treatment infrastructure was under maintained along the coast of Papua New Guinea's capital, Port Moresby. Sewage was being released untreated into the ocean, killing coral reefs in coastal waters, and worsening the environment of the local residents.

To solve this social and environmental issue, Hitachi formed a joint venture with Dai Nippon Construction and began a sewage treatment infrastructure development project. Completed in 2019, the constructed plant has a processing capacity of 18,400 m³ per day. In fiscal 2020, the target population for sewage treatment was about 92,000 people. In the future, it is planned to increase the processing capacity to 25,700 m³ per day to cover a projected target population of about 126,000 people along the coast of the city in 2042. This project goes beyond the construction of a sewage treatment plant. Hitachi has requested collaboration on technical support from Kitakyushu, which has been selected as an Environmental Future City, and is working to ensure stable operation of the facility by proposing efficient O&M and developing human resources, such as through water quality analysis training.



Sewage treatment plant

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Building a Society That Uses Resources Efficiently GRI 417-1

Hitachi's Approach to Transitioning to a Circular Economy

Approach

To help build a recycling-oriented society, Hitachi will advance a shift from the conventional linear economy to a circular economy. At the stages of procurement, development, and design we will advance eco-designs. This includes taking into account ease of disassembly, adoption of mono-materials, durability, repairability, and resource saving as well as greater use of recycled materials and environmentally friendly materials. Beyond the issues of the long-term use of products and their reuse, and the repair, refurbishment, repurposing, and remanufacturing of products that are no longer needed, our customers' needs are changing from goods to experiences or from ownership to leasing. Responding to such a society, we will promote the effective use of resources and assets, such as with leasing, pay-per-use systems, subscriptions, products as a service, reuse, and models for sharing. In the field of technology development to support resource circulation, we will pursue the development of raw materials, products, tools, applications, and services with a view to achieving a circular economy.

Efficient Use of Resources Throughout the Value Chain



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Activities Related to a Circular Economy

Activities

Hitachi High-Tech has developed a high-speed battery deterioration diagnosis method to instantaneously evaluate the performance deterioration and remaining life of lithiumion batteries (LIB) at speeds ranging from several seconds to two minutes compared to two to four hours before. Application of this method in processes ranging from production, the use and reuse, to the recycling of electric vehicles' lithium-ion batteries is expected to enable it to be used as a new data management platform with features including the monitoring of individual battery use, clarification of remaining performance at the reuse and recycling stages, and visualization of factors such as the supply-demand balance and predicted market value in the reuse of batteries.

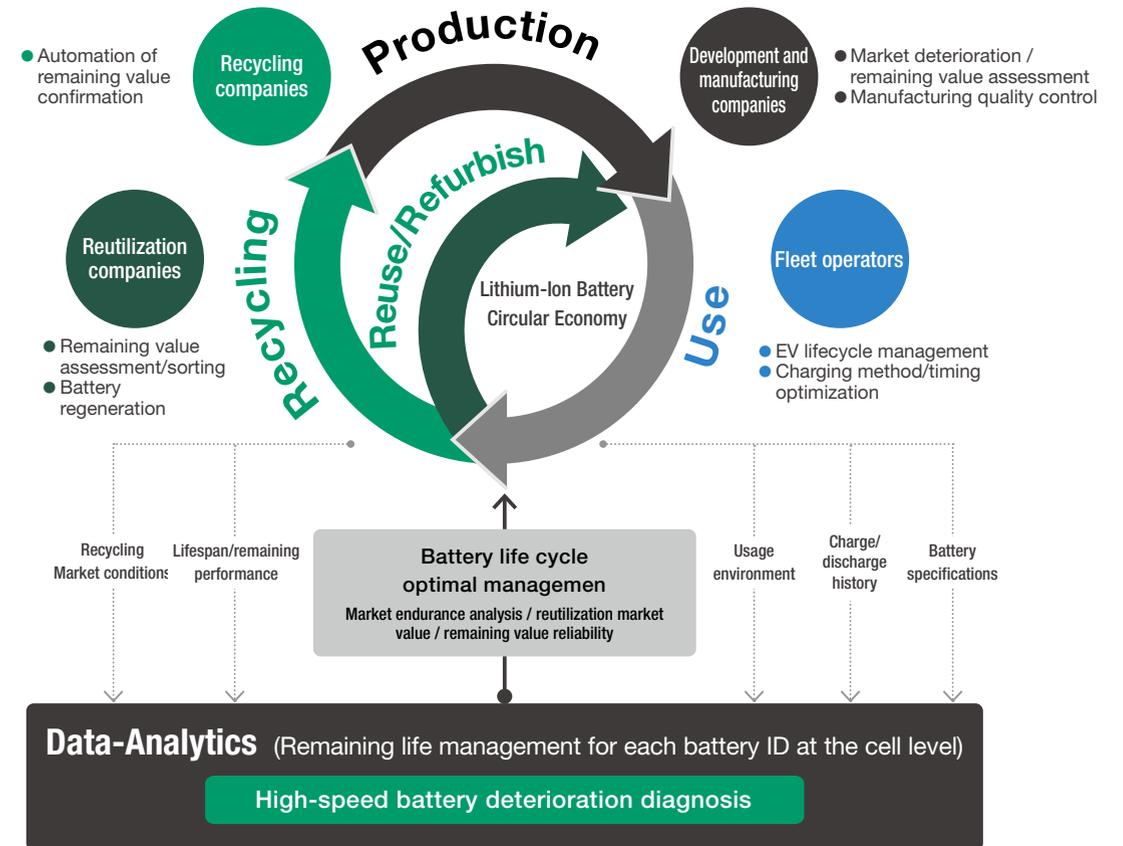
Hitachi ABB Power Grids and Sweden's Stena Recycling have entered into a long-term cooperation agreement on transformer recycling. Encompassing cooperative design work to enable a new smart recycling process for transformers, the agreement constitutes a major step on the path toward realizing a sustainable circular economy.



Efforts aimed at transformer recycling

GRI 301-1/301-2/301-3

Relationship of the Evaluation Method to the Lithium-Ion Battery-Related Circular Economy Business Sector



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Achievements in Fiscal 2020

Japan

IT equipment

Hitachi has established its own product recycling network providing services near its customers to collect and recycle such end-of-life products as supercomputers, mainframes, and other computing machines; communication equipment like network devices and telephone switchboards; and information equipment like ATMs. It recycled a total of 62 tons of products in fiscal 2020.

The United States

Large-capacity storage systems

Hitachi Computer Products (America) and Hitachi Vantara refurbish parts of used devices traded in for new products after cleaning and checking them for use as warranty-backed maintenance components. They reused and recycled a total of 251 tons of products in fiscal 2020.

Japan, China, Australia, and six other countries

Construction machinery units

The Hitachi Construction Machinery Remanufacturing Business remanufactures used units at recycling plants to offer as high-function, reasonably priced units with functions equivalent to those of new ones. It reduced a total of 6,630 tons of industrial waste in fiscal 2020 with a target of 9,500 tons by fiscal 2022.

Japan

Electric components for automobiles

After collecting malfunctioning components from dealers and repair shops, Hitachi Astemo disassembles, checks, cleans and restores, reassembles, and inspects them, and markets them as having the same performance as new products. Approximately 47.5% of electrical components were collected as malfunctioning parts and reused as refurbished products and about 15,000 malfunctioning components (approximately 100 tons) were serviced in fiscal 2020. It reduced approximately 47.5 tons of industrial waste.

Japan

Home appliances

Hitachi Global Life Solutions works to recycle four categories of end-of-life home appliances (air conditioners, TVs, refrigerators/freezers, and washing machines/dryers) at 19 recycling plants as part of cooperative efforts among five companies*1 in response to the 2001 Act on Recycling of Specified Home Appliances. A total of 91,715 kt of recyclable materials*2 were recovered in fiscal 2020 of which approximately 82,408 kt were recycled. By product type, the recycling rate for refrigerators and freezers was 81%, exceeding the legal requirement of 70% by 11 percentage points, and for washing machines and dryers it was 94%, exceeding the legal requirement of 82% by 12 percentage points.

*1 Hitachi Global Life Solutions; Sharp Corp.; Sony Corp.; Fujitsu General Ltd.; and Mitsubishi Electric Corp.

*2 Parts and materials recovered from four categories of end-of-life home appliances (air conditioners, TVs, refrigerators/freezers, and washing machines/dryers) and recycled through in-house use, selling them, or transferring them free of charge to others who will use them. Data values are aggregated from Hitachi Global Life Solutions and Hitachi-Johnson Controls Air Conditioning.

Plastic Recycling Activities

Activities

Hitachi Global Life Solutions, whose plastic consumption accounts for around 70% of the Hitachi Group's total, uses recycled plastic in parts for washing machines and refrigerators and packing materials for ceiling lights. The company procures recycled plastic materials produced within the Hitachi Group using plastic parts recovered from end-of-life home appliances and plastic containers as well as purchasing recycled plastics from materials manufacturers.

Achievements in Fiscal 2020

During fiscal 2020, a total of 1,794 tons of recycled plastic materials from end-of-life home appliances were used as parts for home appliances and packing materials. While large components in washing machines (such as enclosure bases in the lower parts of units) were previously made with mixtures of new and recycled materials, a substantial increase in the use of recycled plastics compared to fiscal 2019 was achieved with the switch to almost 100% recycled material use in fiscal 2020. The clearing of technical problems and the handling of procurement issues are factors in this achievement.

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Management of Waste Generated at Business Sites

Activities

For fiscal 2020, we set a target of a 11% reduction (from a base year of fiscal 2010) for waste and valuables*¹ generated per unit, and bettered this by achieving a 14% reduction. The amount of waste and valuables generated was reduced by 313 kt or 24% compared to the base year. We strived to reduce waste by installing recycling facilities within our business sites as well as through closed-loop recycling, whereby the by-products and scrap from the production process are reused as resources by other business sites, and repeated use of packing and cushioning materials during transport.

Under the Zero Emission*² initiative, which seeks to minimize landfill disposal, 73 business sites out of 162 target business sites achieved their zero waste emissions goal*³ in fiscal 2020.

For hazardous wastes, we collect environmental load data using the Environmental Data Collection System (Eco-DS) to centrally manage the volumes of hazardous wastes generated and exported by type, and to confirm proper disposal within the Group.

*1 Waste and valuables: Materials generated through business activities. Each country has a legal definition of waste, and in Japan, the term refers to refuse, bulky refuse, ashes, sludge, excreta, waste oil, waste acid and alkali, carcasses, and other filthy and unnecessary matter, which are in a solid or liquid state according to the Waste Management and Public Cleansing Law. Valuables, meanwhile, are those materials left over after business activities other than waste, and can be sold or transferred free of charge to other parties as items of value.

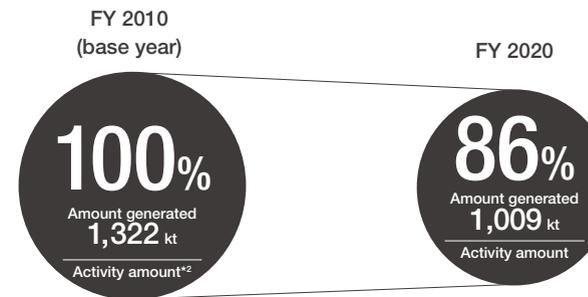
*2 Zero emissions: The principles and methods advanced by the United Nations University in 1994 aimed at eliminating waste from human activity as much as possible while maximizing the use of resources and achieving sustainable economic and manufacturing activities.

*3 Zero waste emissions goal: Defined as a final disposal rate (landfill disposal/waste and valuables) of less than 0.5% in any given fiscal year in the Hitachi Group

[Zero Emission Sites](#)

Environmental Action Plan for 2021 Management Values

Reduction in Waste and Valuables Generation*¹ per Unit (Hitachi Group)

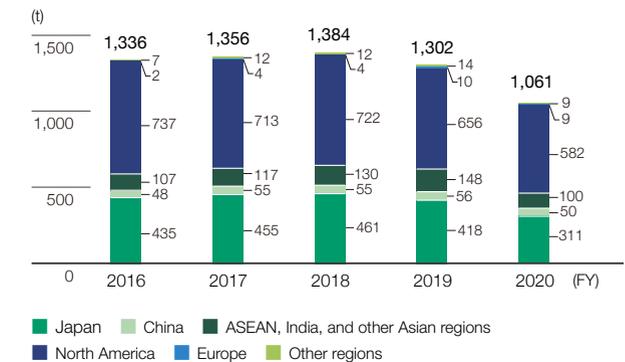


Reduction in Waste and Valuables Generation per Unit compared to base year **14% reduction**
FY 2020 reduction target rate: 11%

*1 Amount of waste and valuables generated from the production process.
*2 Activity amount is a value closely related to waste and valuables generation at each business site (for example, output, sales, and production weight).

GRI 306-1/306-2/306-3

Waste and Valuables Generation*¹ (Hitachi Group)



*1 The total amount of waste and valuables generated in manufacturing processes plus that generated in offices and other nonmanufacturing businesses. Note: Regional classifications were changed in fiscal 2020, and the past data was recalculated based on this.

[Case studies of Efficient Use of Resources](#)